CLAIMS

1. A barcode recognition apparatus comprising:

   preprocessing means for preprocessing an input image;

   binarization process means for binarizing the preprocessed input image;

   labeling means for labeling the binarized input image;

   barcode field extracting means for extracting a barcode field from the labeled input image; and

   barcode recognizing means for recognizing a barcode from the extracted barcode field.

2. The barcode recognition apparatus according to claim 1, wherein the preprocessing means performs a histogram transformation.

3. The barcode recognition apparatus according to claim 1 or 2, wherein binarization process means employs a discriminant analysis method as a method for determining a threshold value in the binarization of an image.

4. The barcode recognition apparatus according to any one of claims 1 to 3, wherein labeling means performs labeling by allocating individual numerical value names to each of patterns that are connected to the input image.

5. The barcode recognition apparatus according to claim 4, wherein the width of a bar is defined in the number of black pixels/the height in the vertical direction regarding the labels of the bar from the input image labeled by labeling means.

6. The barcode recognition apparatus according to claim 5, wherein when the widths of bars or spaces are collated, an allowable range of the widths is set in accordance with the widths.

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7. The barcode recognition apparatus according to any one of claims 1 to 6, wherein the barcode field extracting means extracts the adjacency relationship of bars, determines a left end and a right end of the bars in accordance with the adjacency relationship, and extracts a barcode field through the correspondence of the number of bars between the left end and the right end of the bars to a certain value that has been prescribed.

8. The barcode recognition apparatus according to claim 7, wherein the adjacency relationship of the bars is determined to be adjacent when all of the conditions that two bars share a scanning line, that the difference of the heights between the two bars is within a certain range, and that the distance between the two bars is within a certain range, are satisfied, and wherein, the range of the difference of the bar heights and the range of the distance of the bars are obtained in an adaptive manner from the height and width of a bar used as a criterion.

9. The barcode recognition apparatus according to claim 7 or 8, wherein barcode recognition employs the minimum width of the bars in the barcode field as a unit width, the barcode field being extracted via the barcode field extracting means, and wherein the barcode recognition is performed by collating the arrangement of the pattern of the widths of bars and spaces in the extracted barcode field, the widths being integral multiples of the unit width, with a prescribed arrangement of the pattern of the widths of bars and spaces.

10. The barcode recognition apparatus according to claim 9, wherein the barcode recognition is repeated varying the unit width.

11. A mobile phone comprising the barcode recognition apparatus according to any one of claims 1 to 10.

12. A barcode recognition method comprising the steps of:

preprocessing an input image;

binarizing the preprocessed input image;

labeling the binarized input image;

extracting a barcode field from the labeled input image; and

recognizing a barcode from the extracted barcode field.

13. A program for enabling a computer to function as a barcode recognition apparatus comprising:

preprocessing means for preprocessing an input image;

binarization process means for binarizing the preprocessed input image;

labeling means for labeling the binarized input image;

barcode field extracting means for extracting a barcode field from the labeled input image; and

barcode recognizing means for recognizing a barcode from the extracted barcode field.

14. A recording medium readable via a computer, wherein the program according to claim 13 is recorded.